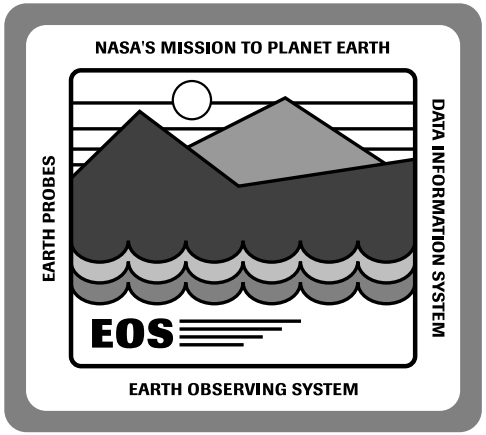
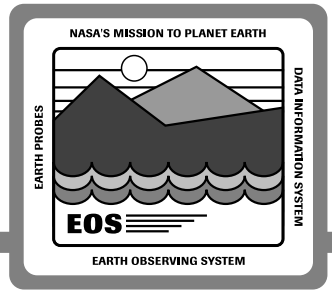


Interoperability Architecture

Richard Meyer

13 - 14 December 1993

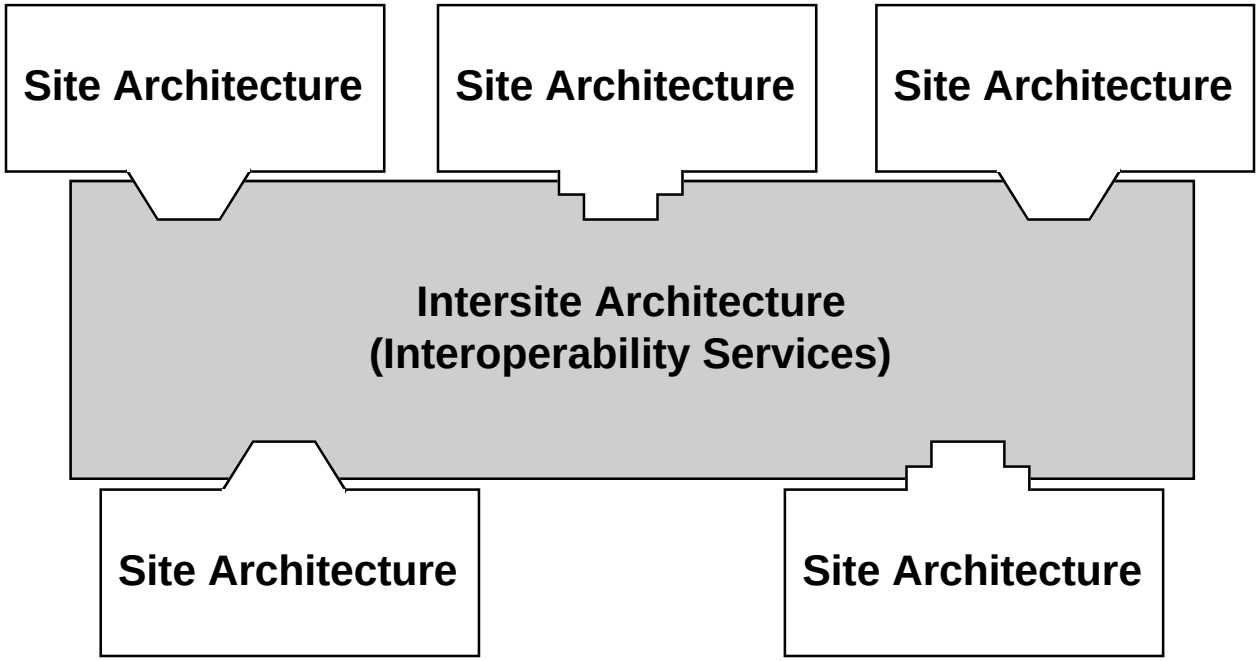
Interoperability



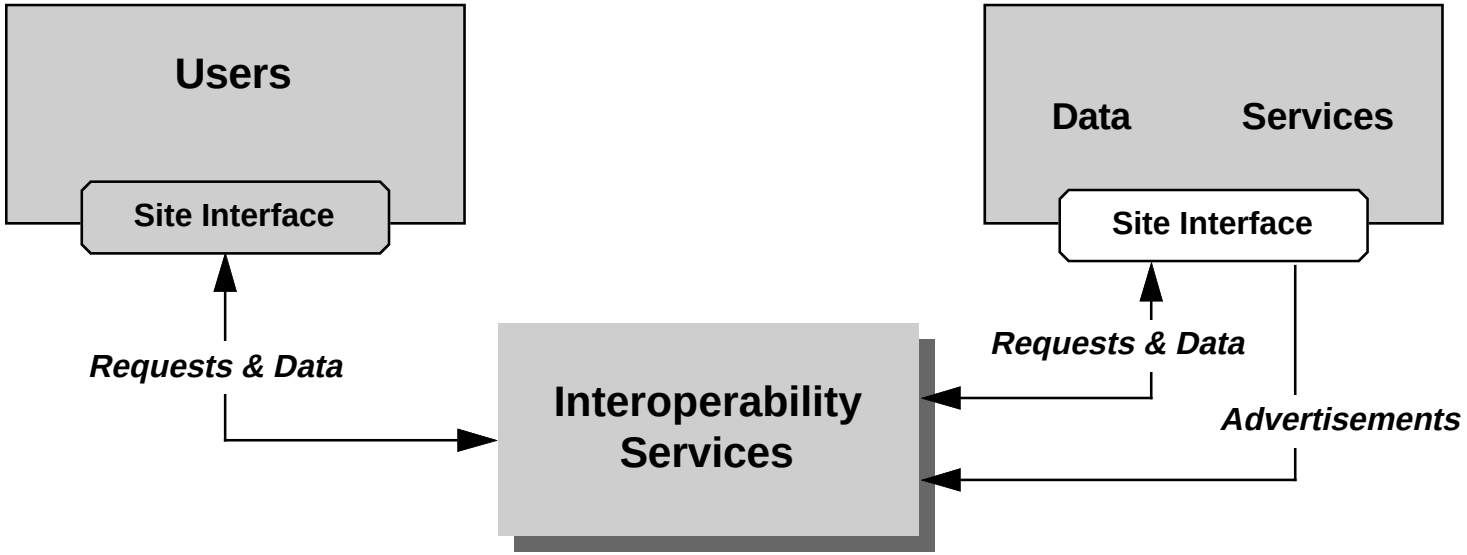
- **“publishing and “access”**
- **seamless view of data**
- **heterogeneous, autonomous system components**

- **users can view the data network as an integrated whole**
- **data interoperability (e.g., coincident search, collaboration systems) is possible (where it makes sense)**
- **data providers can use whatever interoperability protocols make sense**
- **interoperability capabilities should evolve as technology and research evolves**

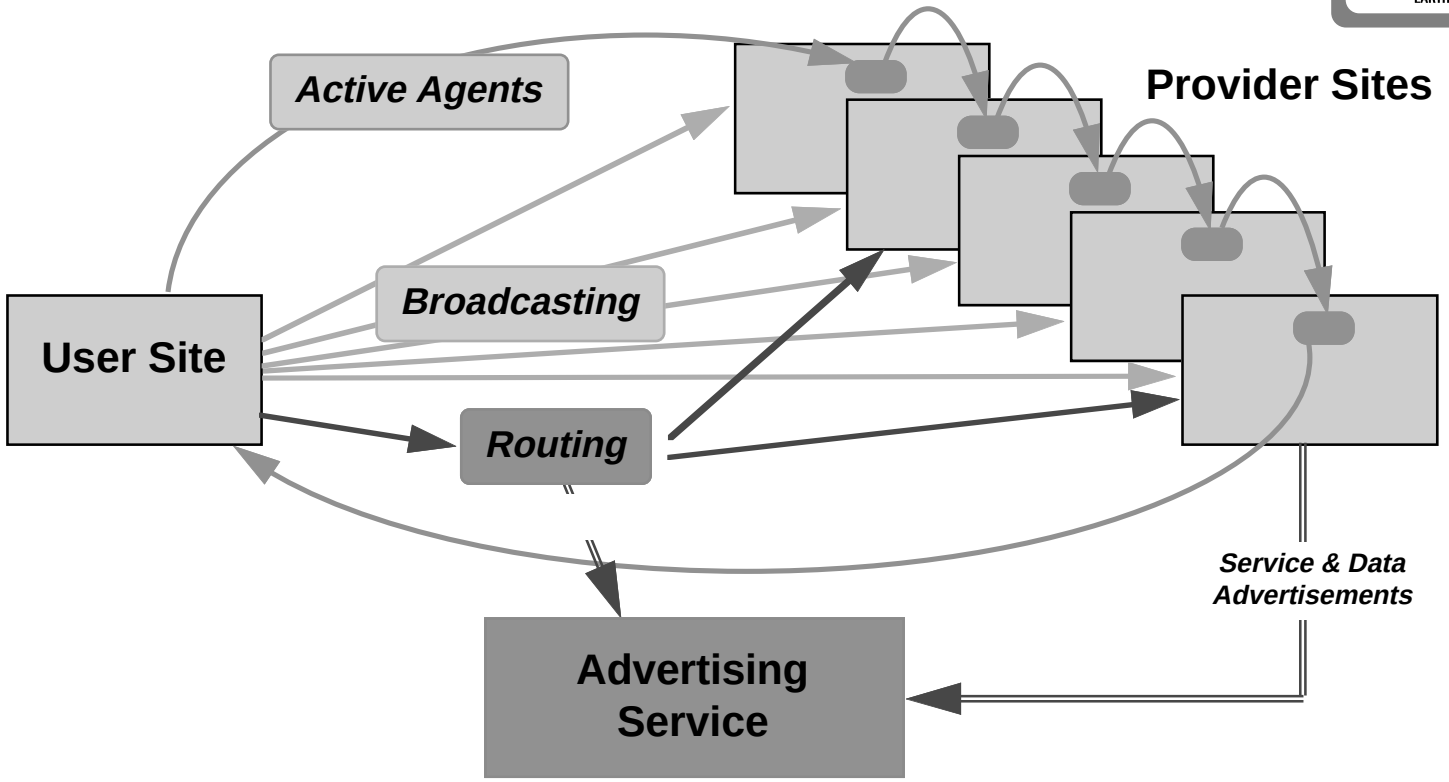
Problem Division



Intersite Services

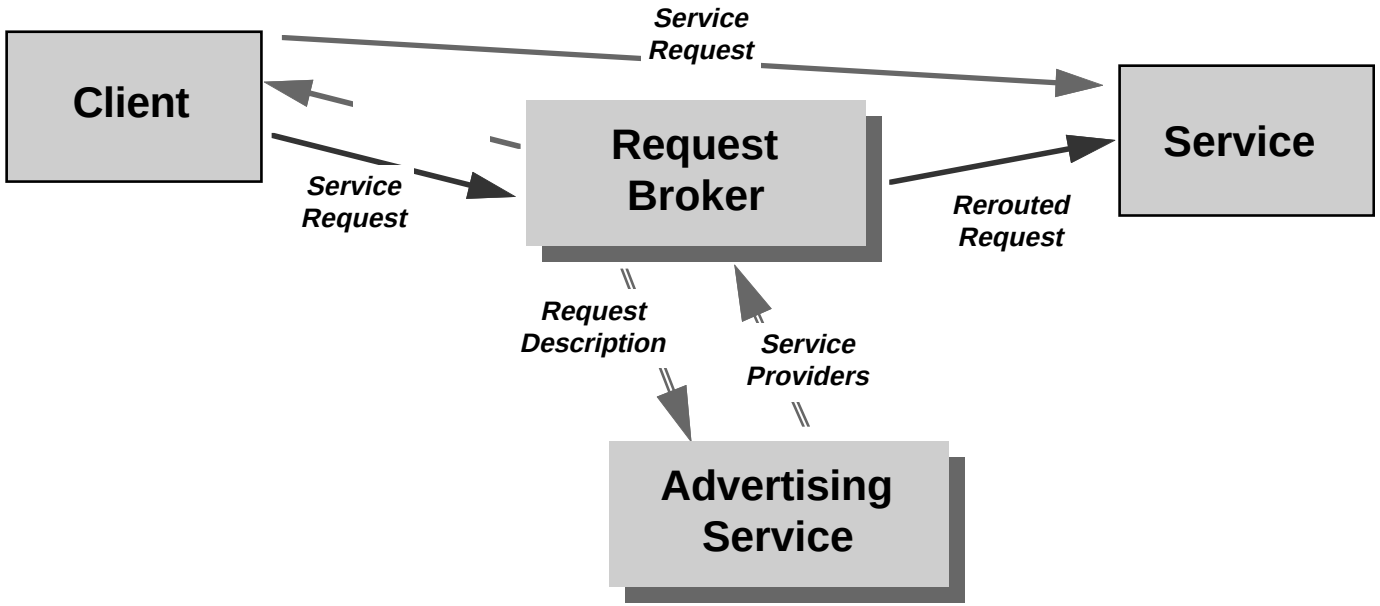


Advertising & Routing



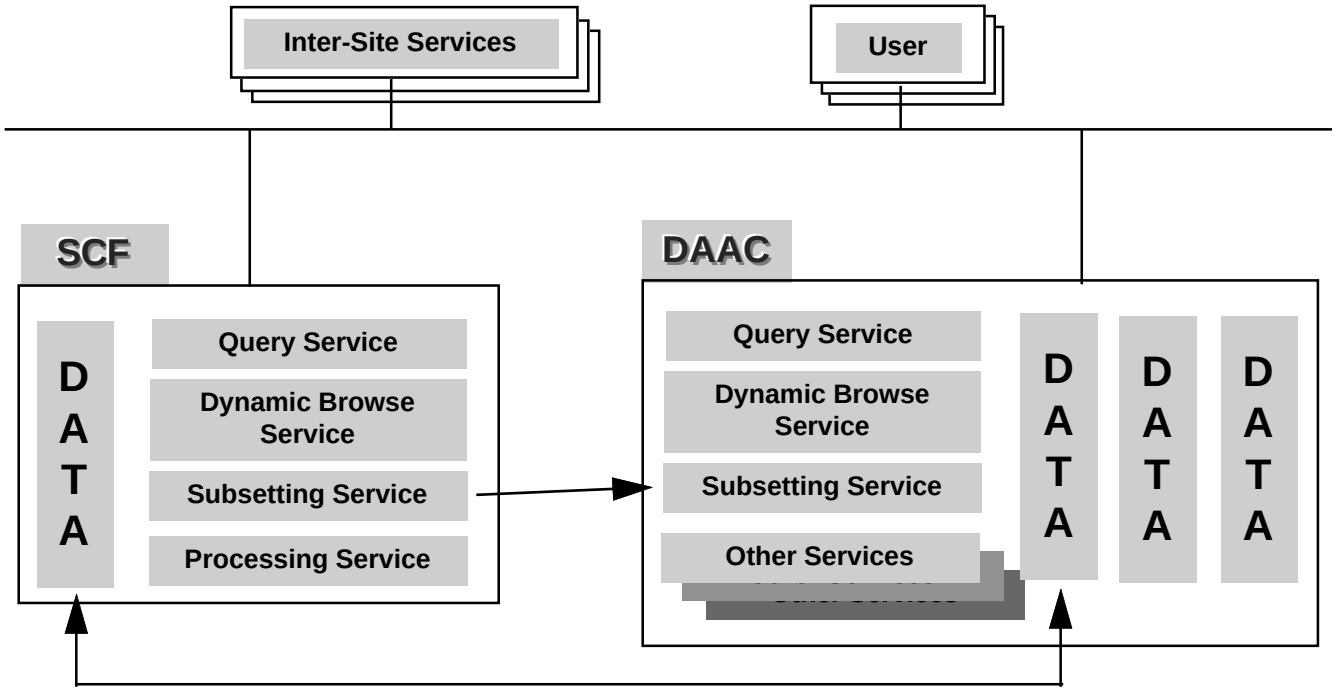
- **Advertisements: Describe Data and Services Offered by Providers**
- **Advertising Service: Manages And Provides Access To This Information**
- **Routing: Matches Request Description Against Advertisements**

Request Broker



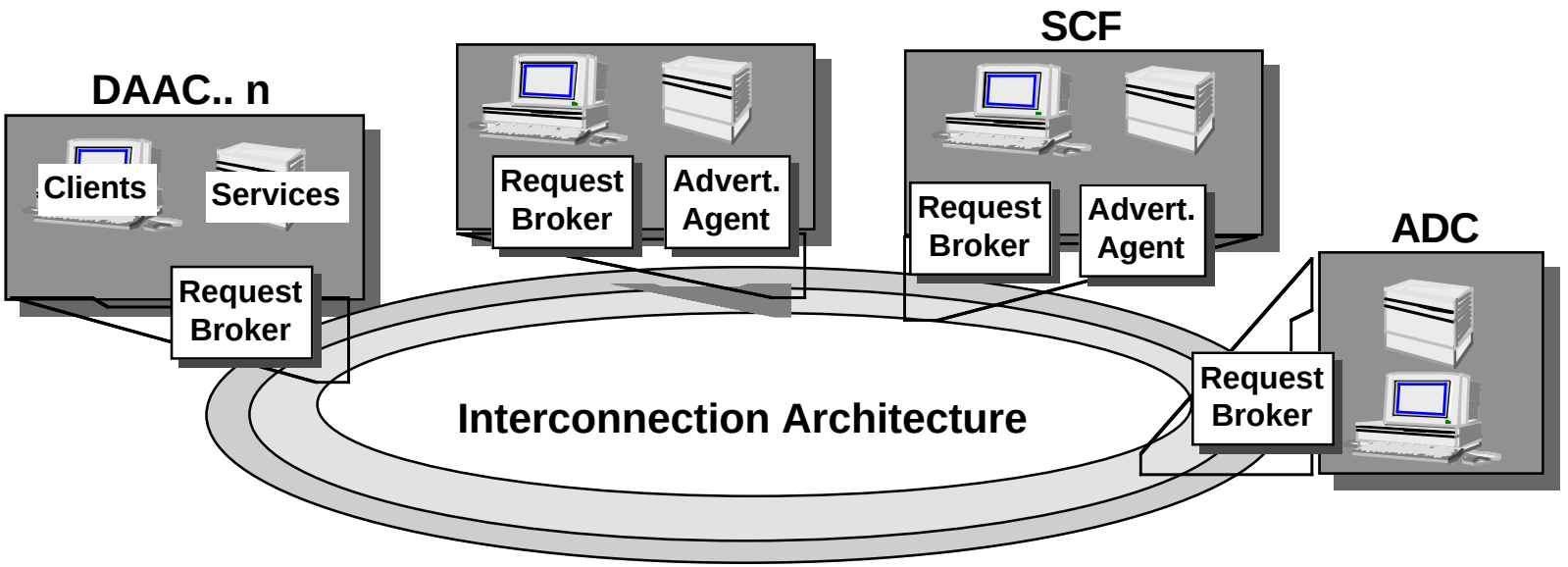
- Request Broker Uses Advertising Service
- Reroute Service Request -OR- Tell Client Where To Go
- Location Of Service Is Irrelevant

Example: SCF/DAAC Interoperability



- **Services And Data Can Move Between SCFs And DAACs**
- **Clients Do Not Need To Know Whether Service Is At SCF Or DAAC**

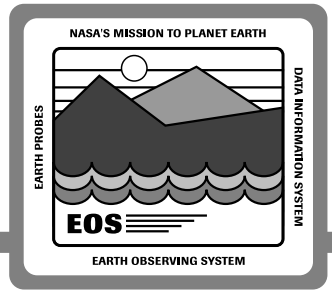
Interoperation Approach



- Sites Are Architecturally Equal
- Sites Choose Services or Are Allocated Services

DAAC 1

Challenges/Issues



FINDING THINGS

VOCABULARY

- **V0 Lesson - Need Managed Dictionary And Vocabulary**
- **.... Cannot Expect To Have Single "Global" Vocabulary / Dictionary (Especially Not In GCDIS/userDIS)**

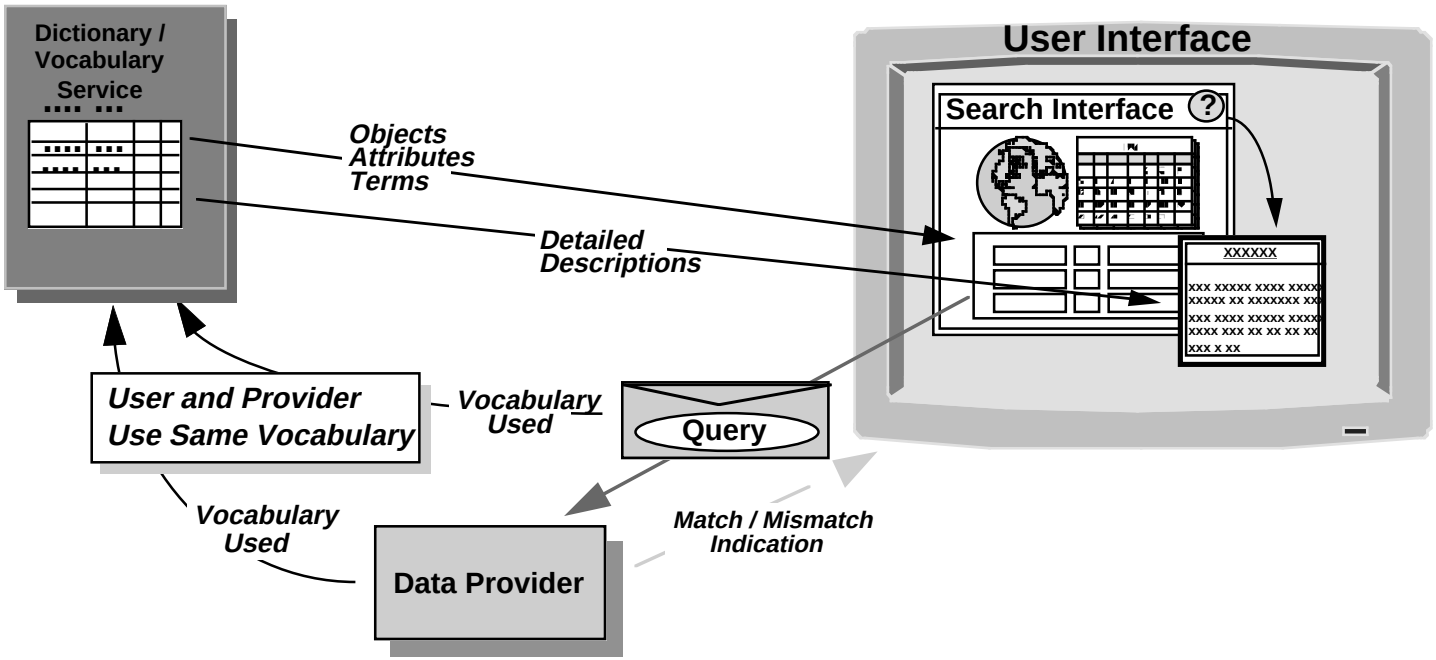
DATA/TOOL COMPATIBILITY

- **Can't Require Common Interchange Standard As Basis For Interoperation**
- **Must Support User And Data Providers In Dealing With Incompatibilities**

MULTI-PROTOCOL SUPPORT

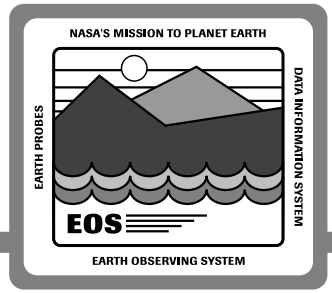
- **V0 Lesson - Must Support Multiple Access Possibilities For Some Data**
- **Must Support Clients And Services To Find Compatible Interconnection If It Exists**

Vocabulary



- **Users / Programs Can Have Vocabulary Context**
- **Vocabulary Context Is Identified In Requests**
- **Intermediaries And Providers Can Use Context Information**

Vocabulary



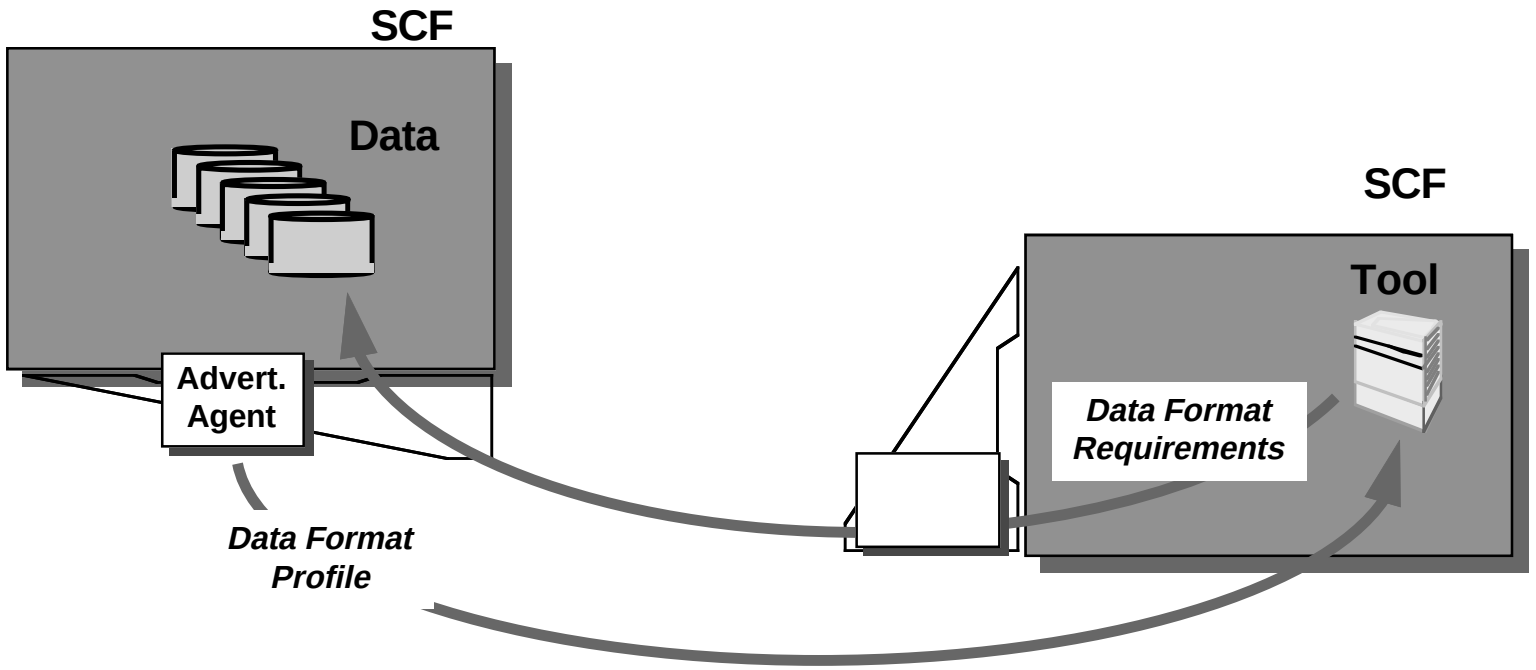
Support Concept of "Vocabulary Context"

- **Vocabulary Can Be A: Dictionary, Word List, Thesaurus, ...**
- **User Interface Can Obtain Vocabulary Information To Assist User**
- **User Could Ignore Or Use Vocabulary**
- **Could Have "Managed Vocabularies"**

Consequences

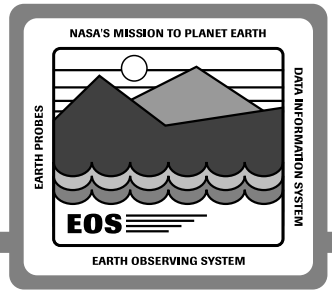
- **Short Term - Can Check Whether Same / Different / No Particular Vocabulary Is Used**
- **Mid Term - Can Use Synonyms, Homonyms, Etc. To Make Life Easier For Users**
- **Long Term - Could Attempt Semantic Mapping And Translation**

Tool and Data Compatibility



- Data Providers Can Advertise Or Provide On Request Data Formats
- Requests Can Specify Format Requirements
- Intermediaries And Providers Can Use Format Information

Tool and Data Compatibility



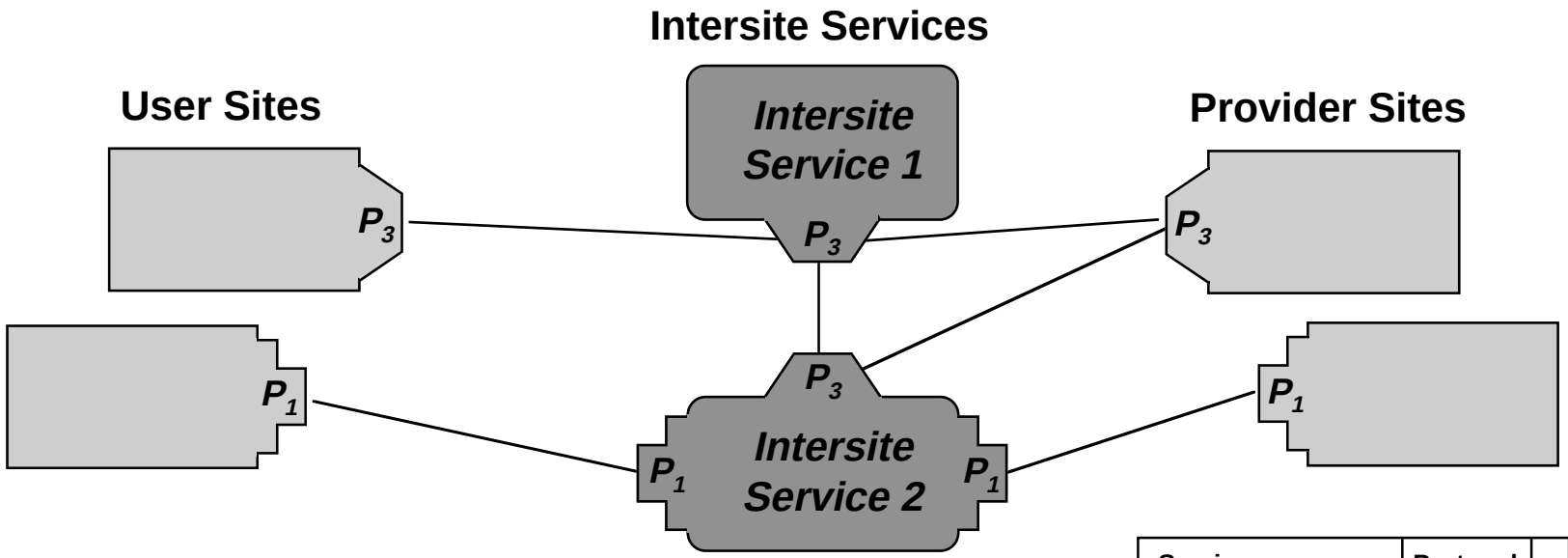
Support Concept of 'Data Format Profiles'

- **Profile Can Include: Data Type, Format Type, Format Subtypes, Version, Machine Origin, ...**
- **Profile Will Be Extensible: Can Add Characterizations Needed For New Types Of Data And Formats**
- **Profile Purpose: Characterize Interchange Requirements**

Consequences

- **Short-Term: Users Can Find 'Compatible Providers'; Can Assess Incompatibility Issues; Find Translators ....**
- **Mid-Term: Can Create 'Scripts' To Automate Multi-Step Retrieval Process**
- **Long-Term: Can Develop 'Intelligent' Brokers**

Multi-Protocol Support

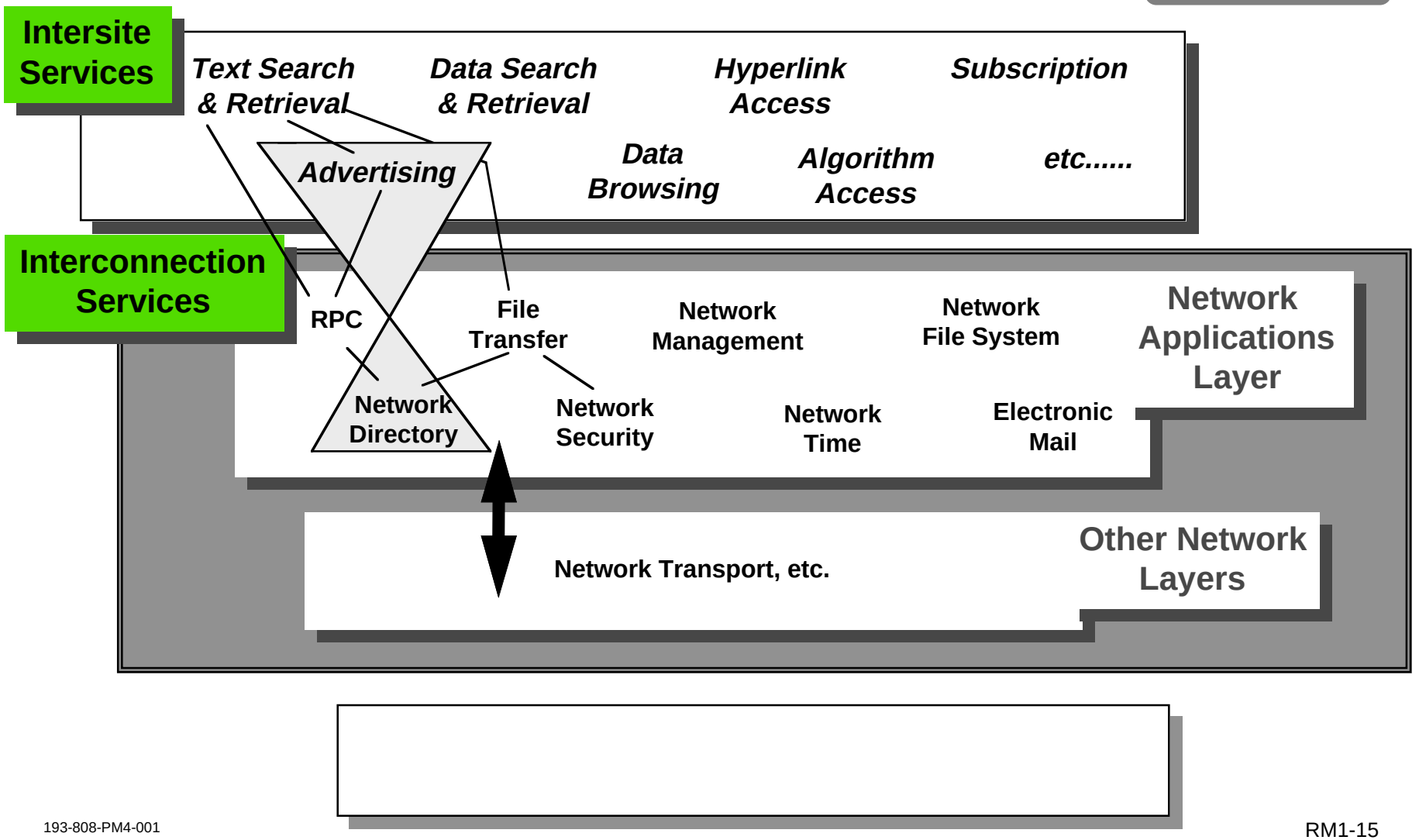


Service	Protocol	...	...
Intersite Service 1	P3		
Intersite Service 2	P1, P3		
.....	....	...	...

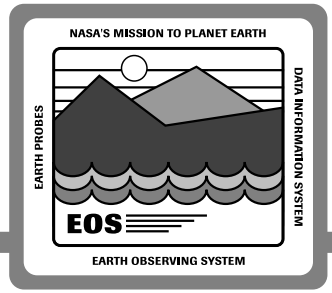
Advertising Directory

- **Intersite Services Advertise Like Any Other Service**
- **A Provider Can Advertise Multiple Protocols**
- **A Provider Can Also Advertise 'Gateway' Services**

Protocol Reference Model



Interconnection Issues



- **number of applications protocols needed**
- **overlap with and incompatibility of existing protocols**
- **method of interfacing with communications protocols**